CHAPTER 2

RECOGNIZE UXO

Being able to recognize a UXO is the first and most important step in reacting to a UXO hazard. There is a multitude of ordnance used throughout the world, and it comes in all shapes and sizes. This chapter explains and shows the general identifying features of the different types of ordnance, both foreign and US. In this chapter, ordnance is divided into four main types: dropped, projected, thrown, and placed.

DROPPED ORDNANCE

Regardless of its type or purpose, dropped ordnance is dispensed or dropped from an aircraft. Dropped ordnance is divided into three subgroups: bombs; dispensers, which contain submunitions; and submunitions. Photographs of dropped ordnances and their net explosive weights (NEWS) are in Appendix B.

BOMBS

As shown in Figure 2-1, page 2-2, general-purpose bombs come in many shapes and sizes depending on the country that made them and how they are to be used. Generally, all of these bombs are built the same and consist of a metal container, a fuze, and a stabilizing device. The metal container (called the bomb body) holds an explosive or chemical tiller. The body may be in one piece or in multiple pieces. The bombs shown in Figure 2-2. page 2-3, are Soviet-style, general-purpose bombs.

Chemical-agent filled bombs are built the same as general-purpose bombs. In Figure 2-3, page 2-4, the US chemical bombs are general-purpose bombs. They have a chemical filler in place of an explosive filler. The color codes and markings shown in

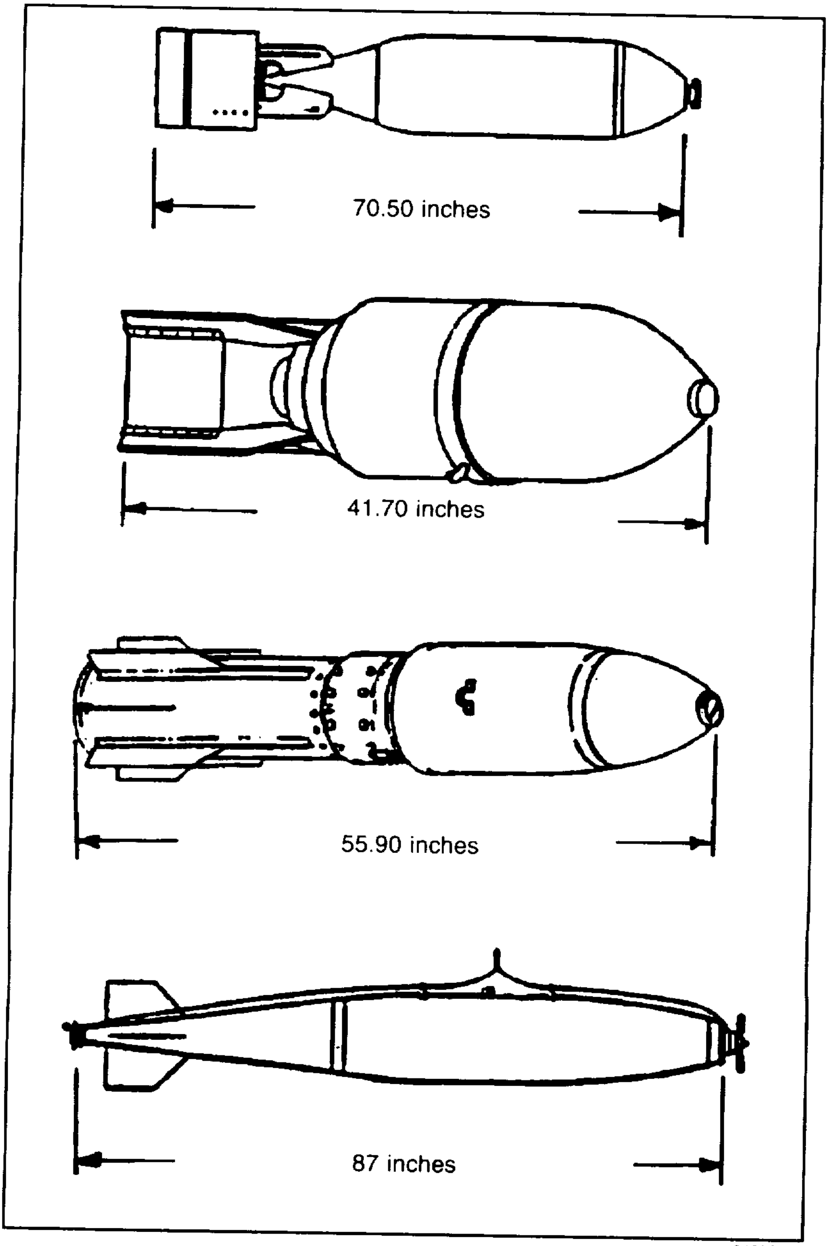

Figure 2-1. General-purpose bombs.

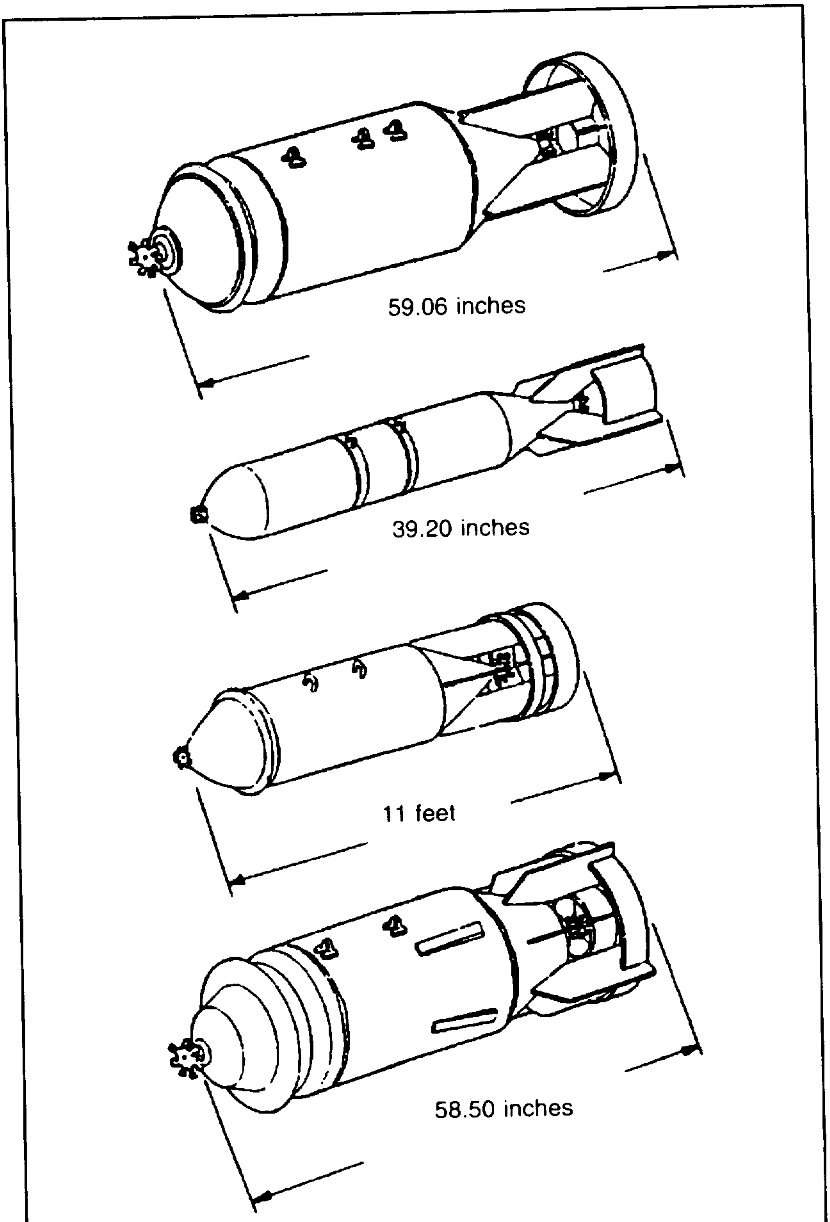

Figure 2-2. Soviet-style, general-purpose bombs.

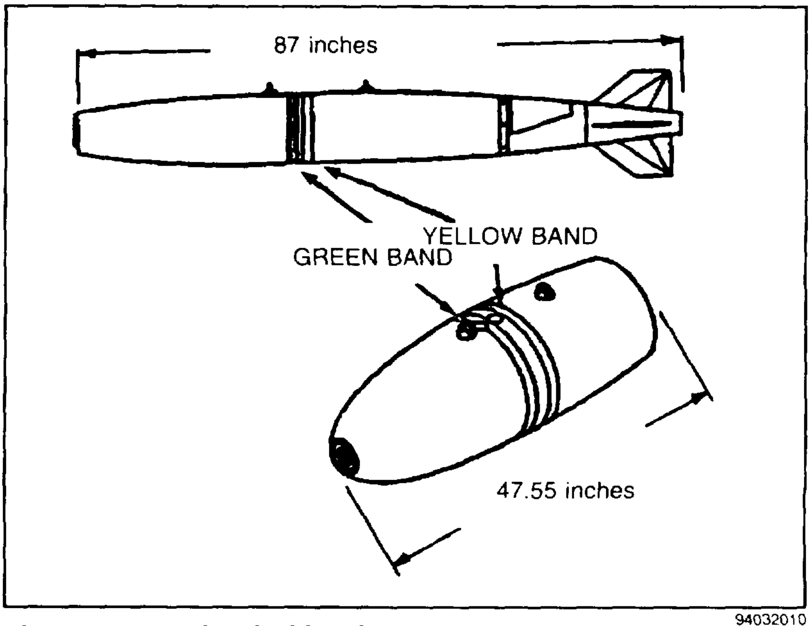

Figure 2-3. US chemical bombs.

Appendix A may be used to identify chemical bombs. For example, the US and North Atlantic Treaty Organization (NATO) color code for chemical munitions is a gray background with a dark green band. The former Soviet Union used the same bombs as shown in Figure 2-2, page 2-3, and added a combination of green, red, and blue markings to the nose and tail sections to indicate chemical agents. Soviet bombs all have a gray background. See Appendix A.

Fuzes

Fuzes used to initiate bombs are either mechanical or electrical, They are generally placed in the nose or tail section, internally or externally. The fuzes may not always be visible, as they are often covered by the fin assembly. As shipped, fuzes are in a safe (unarmed) condition and cannot function until armed.

Mechanical fuzing, whether in the nose or in the tail, is generally armed by some type of arming vane as shown in Figure 2-4.

The arming vane assembly operates like a propeller to line up all of the fuze parts so the fuze will become armed.

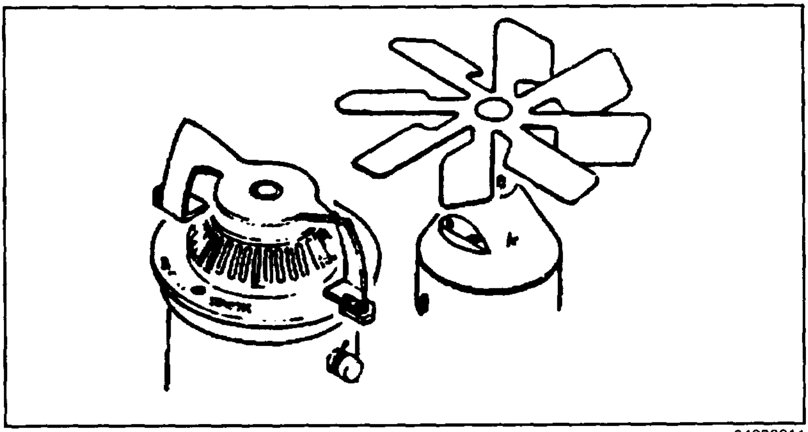

Figure 2-4. Arming vane assemblies.

Electrical fuzes have an electric charging assembly in place of an arming vane. They are armed by using power from the aircraft. Just before the pilot releases the bomb, the aircraft supplies the required electrical charge to the bomb's fuze.

Action of the fuze may be impact, proximity, or delay. Impact fuzes function when they hit the target. Proximity fuzes function when bombs reach a predetermined height above the target. Delay fuzes contain an element that delays explosion for a fixed time after impact.

To be safe, personnel should consider that all bombs have the most dangerous kind of fuzing, which is proximity or delay. Approaching a proximity- or delay -fuzed bomb causes unnecessary risk to personnel and equipment. Although it should function before it hits the target, proximity fuzing may not always do so. Once the bomb hits the ground, the proximity fuze can still function. It can sense a change in the area around the bomb and blow up. Delay fuzing can be mechanical, electrical, or chemical. Mechanical- and electrical-delay fuzes are nothing more than clockwork mechanisms. The chemical-delay fuze uses a chemical compound inside the fuze to cause a chemical reaction with the firing system. Delay fuzing times can range from minutes to days.

Stabilizing Devices

Bombs are stabilized in flight by either fin or parachute assemblies. These assemblies attach to the rear section of the bomb and keep the bomb nose-down during its descent. These assemblies can separate from the bomb after the bomb hits the ground. As shown in Figure 2-5, two common types of fin assemblies used by foreign countries are the conical- and box-fin assemblies. The retarding-fin assembly shown in Figure 2-6 is used by the US for most of its general-purpose bombs.

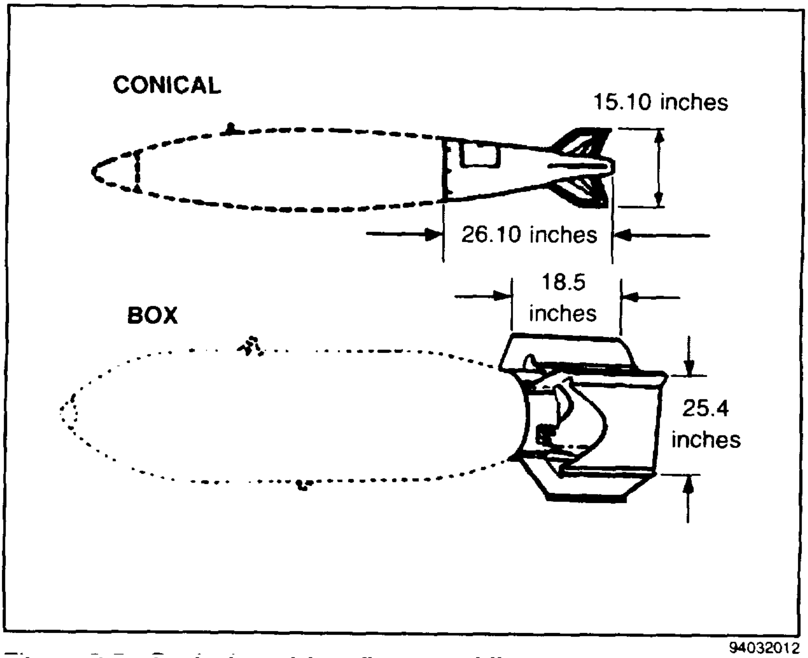

Figure 2-5. Conical- and box-fin assemblies.

Some bombs are stabilized by a parachute assembly as shown in Figure 2-7. The parachute assembly opens after the bomb is released from the aircraft. Even though the parachute may separate from the bomb after it hits the ground, you should never try to

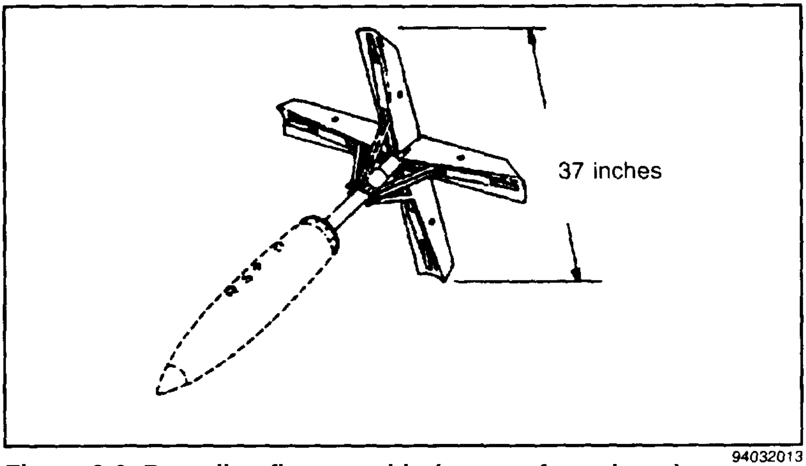

Figure 2-6. Retarding-fin assembly (opens after release).

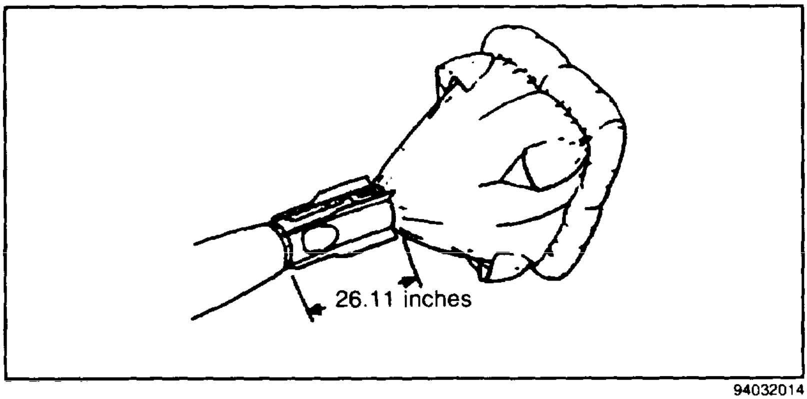

Figure 2-7. Parachute assembly.

recover a parachute assembly found lying on the ground. The bomb may have become buried, and the parachute could still be attached to the bomb.

As shown in Figure 2-8, page 2-8, former Soviet Union bombs have fins that are welded to the bomb body. Therefore, the fins cannot become separated from the bomb. However, the fins can wrap around the rear section of the bomb after it hits the ground and obscure the tail fuze from view.

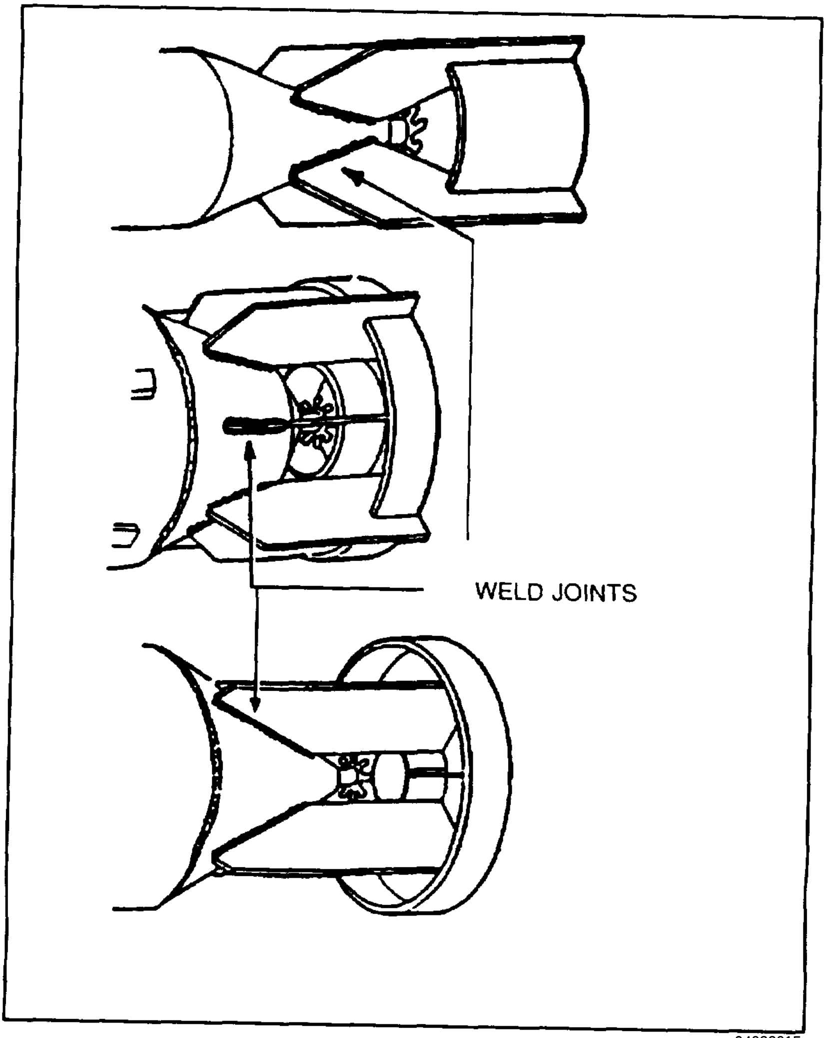

Figure 2-8. Soviet-style fin assemblies. 94032015

DISPENSERS

Dispensers may be classified as another type of dropped ordnance. Like bombs, they are carried by aircraft. Their payload, however, is smaller ordnance called submunitions. Submunitions are discussed later in this chapter, In Figure 2-9, the cutaway shows the submunitions inside the dispenser body. Dispensers come in a variety of shapes and sizes depending on the payload inside. Some dispensers are reusable, and some are one-time-use items.

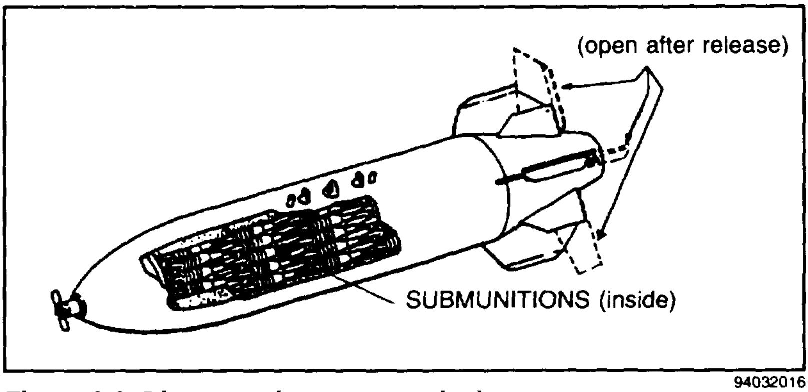

Figure 2-9. Dispenser (cutaway section).

Never approach a dispenser or any part of a dispenser you find on the battlefield. The payload of submunitions always scatters in the area where the dispenser hit the ground.

Dropped Dispensers

These dispensers (Figure 2-10, page 2-10) fall away from the aircraft and are stabilized in flight by fin assemblies. Dropped dispensers may be in one piece or in multiple pieces. All dropped dispensers use either mechanical time or proximity fuzing. These fuzes allow the payload to be dispersed at a predetermined height above the target. Multiple-piece dispensers open up and disperse their payload when the fuze functions. Single-piece dispensers eject their payload out of ports or holes in the body when the fuze functions.

Attached Dispensers

These dispensers stay attached to the aircraft and can be reloaded and used again. Their payload is dispersed out the rear or from the bottom of the dispenser. See Figure 2-11, page 2-11.

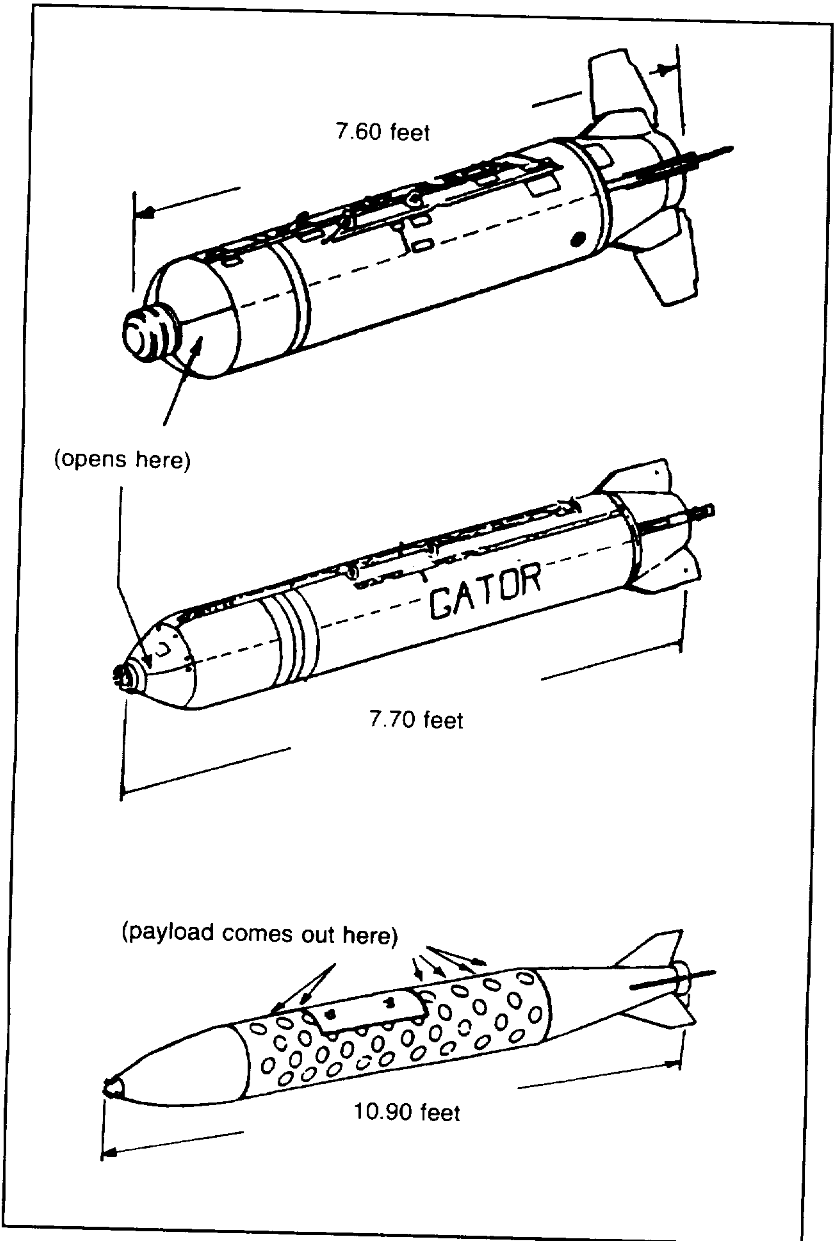

Figure 2-10. Dropped dispensers.

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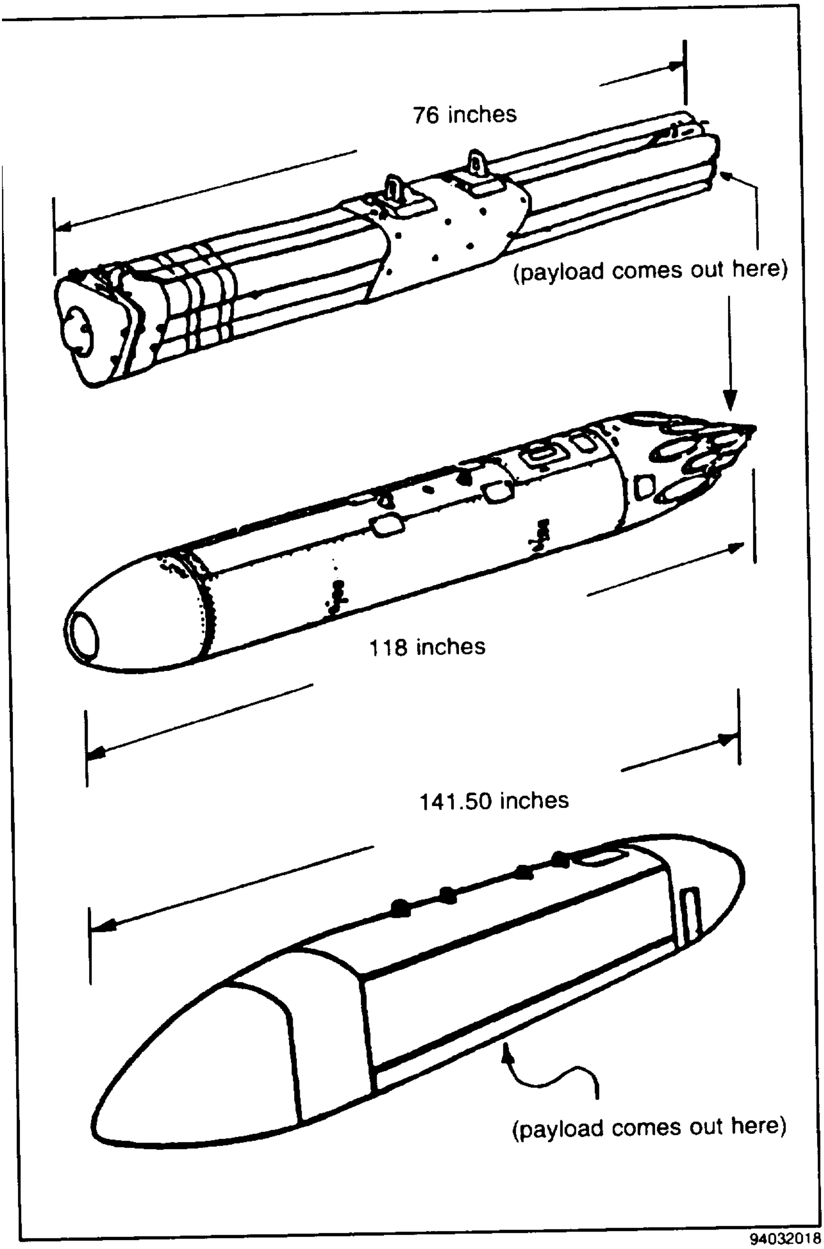

Figure 2-11. Attached dispensers.

SUBMUNITIONS

Submunitions are classified as either bomblets. grenades, or mines. They are small explosive-filled or chemical-filled items designed for saturation coverage of a large area. They may be antipersonnel (APERS), antimateriel (AMAT), antitank (AT), dual-purpose (DP), incendiary, or chemical. Submunitions may be spread by dispensers, missiles, rockets, or projectiles. Each of these delivery systems disperses its payload of submunitions while still in flight, and the submunitions drop over the target. On the battlefield, submunitions are widely used in both offensive and defensive missions.

Submunitions are used to destroy an enemy in place (impact) or to slow or prevent enemy movement away from or through an area (area denial). Impact submunitions go off when they hit the ground. Area-denial submunitions, including FASCAM, have a limited active life and self-destruct after their active life has expired.

The major difference between scatterable mines and placed mines is that the scatterable mines land on the surface and can be seen. Placed mines, discussed in a later section, may be hidden or buried under the ground and usually cannot be seen.

The ball-type submunitions shown in Figure 2-12 are APERS. They are very small and are delivered on known concentrations of enemy personnel. The submunition shown in Figure 2-13 is scattered across an area. Like a land mine, it will not blow up until pressure is put on it.

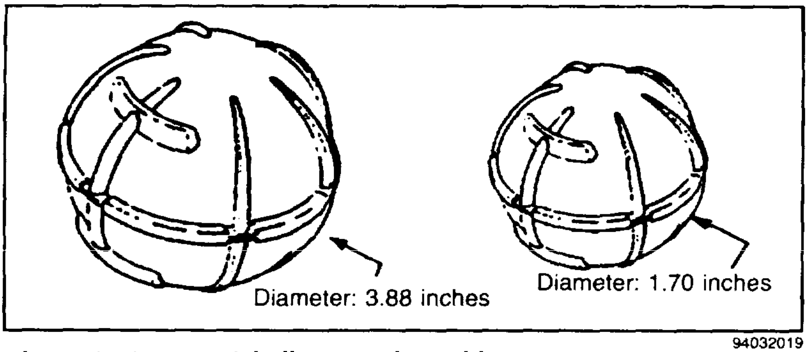

Figure 2-12. APERS ball-type submunitions.

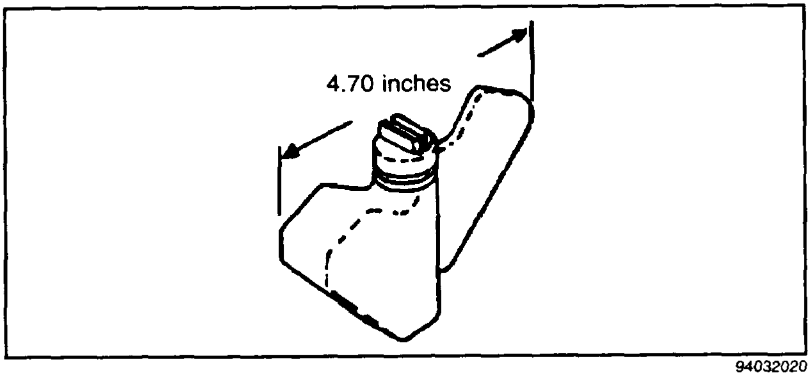

Figure 2-13. APERS pressure-activated submunition.

The APERS submunition shown in Figure 2-14 can be delivered by aircraft or by artillery. When it hits the ground, a small fragmentation ball shoots up and detonates about 6 feet above the ground. The submunitions shown in Figure 2-15, page 2-14, are area-denial APERS submunitions (FASCAM). These submunitions are delivered into areas for use as mines. When they hit the ground, trip wires kick out up to 20 feet from the mine. All area-denial submunitions use antidisturbance fuzing with self-destruct fuzing as a backup. The self-destruct time can vary from a couple of hours to as long as several days.

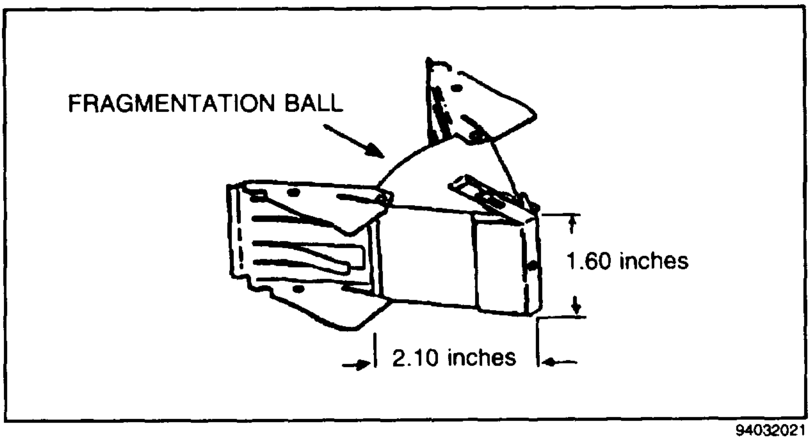

Figure 2-14. APERS bounding-fragmentation submunition.

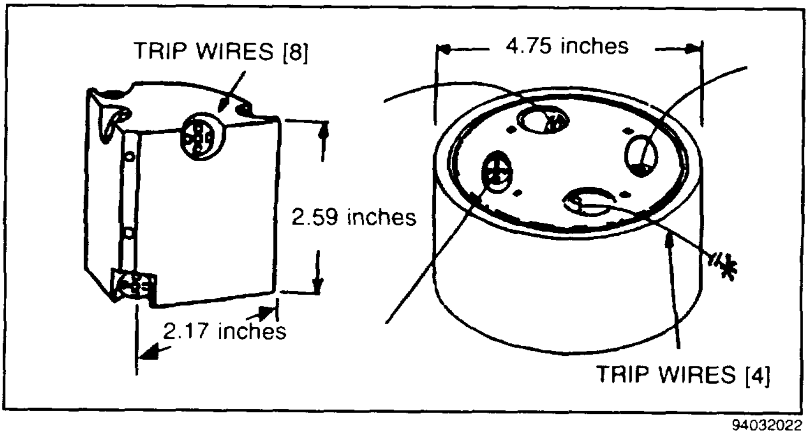

Figure 2-15. APERS area-denial submunitions (FASCAM).

The DP submunition shown in Figure 2-16 has a shaped charge for penetrating hard targets but is also used against personnel. These submunitions are delivered by artillery or rockets. The arming ribbon serves two purposes: it not only arms the fuze as the submunition comes down. but it also stabilizes the submunition so that it hits the target straight on.

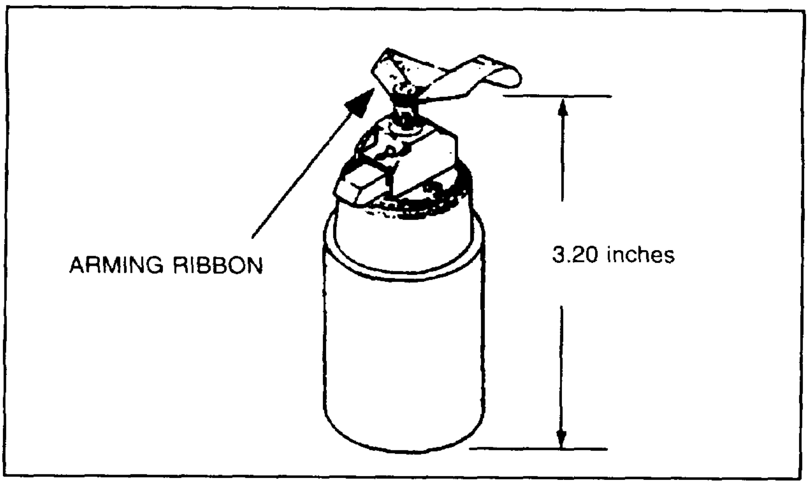

Figure 2-16. DP submunition.

The AMAT and/or AT submunitions shown in Figure 2-17 are designed to destroy hard targets such as vehicles and equipment. They are dispersed from an aircraft-dropped dispenser and function when they hit a target or the ground. Drogue parachutes stabilize these submunitions in flight so they hit their targets straight on. The submunitions shown in Figure 2-18 are also used to destroy hard targets such as vehicles and equipment. The only difference is that the fin assembly stabilizes the submunition instead of the drogue parachute.

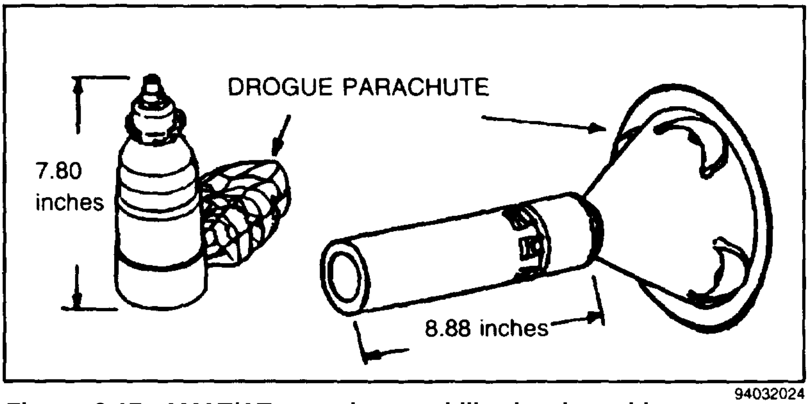

Figure 2-17. AMAT/AT parachute-stabilized submunitions.

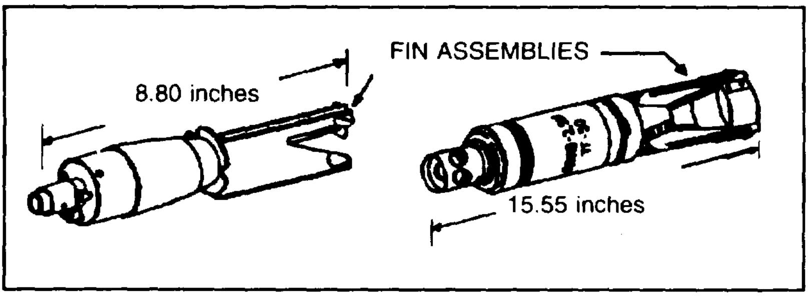

Figure 2-18. AMAT/AT fin-stabilized submunitions.

AT area-denial submunitions (Figure 2-19, page 2- 16) can be delivered by aircraft, artillery, and even some engineer vehicles. These FASCAMs all have magnetic fuzing. They will function when they receive a signal from metallic objects. These submunitions, similar to the APERS area-denial submunitions that are shown in Figure 2-15 on page 2-14, also have antidisturbance and self-destruct fuzing. AT and APERS area-denial mines are usually found deployed together.

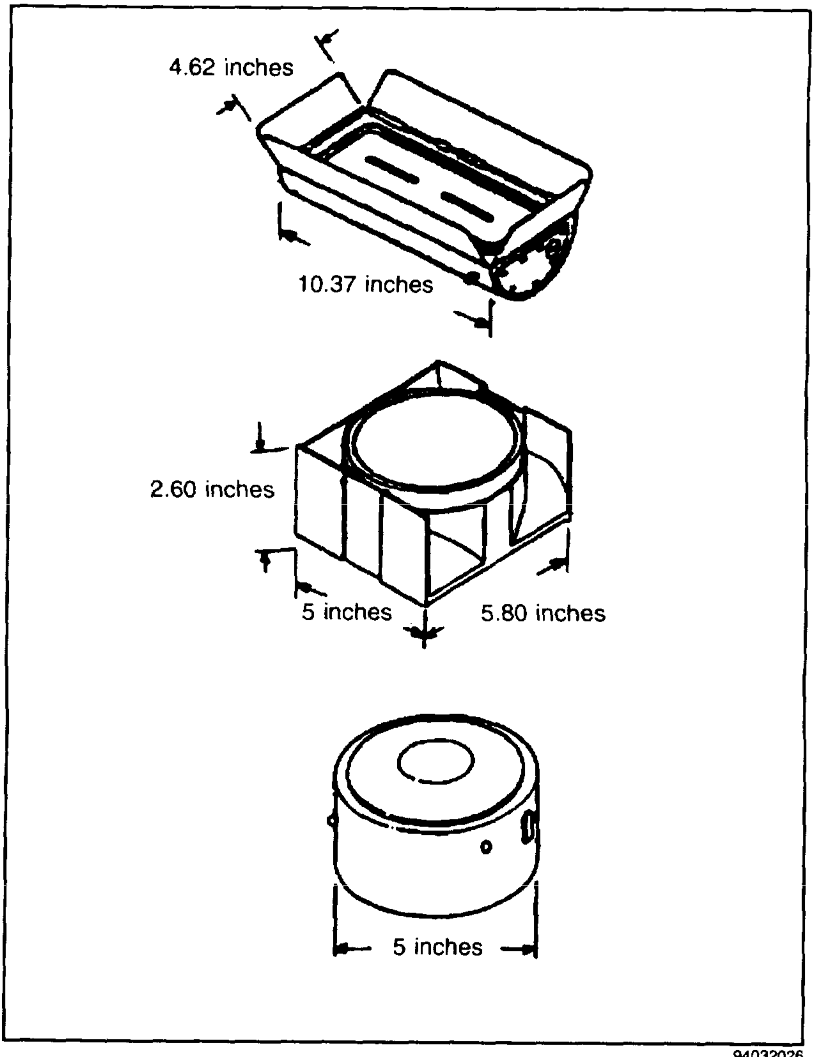

Figure 2-19. AT area-denial submunitions (FASCAM).

PROJECTED ORDNANCE

All projected ordnance is fired from some type of launcher or gun tube. Photographs and NEWS of projected ordnances are shown in Appendix C. Projected ordnance falls into the following five subgroups:

- Projectiles.
- Mortars.
- Rockets.
- Guided missiles.
- Rifle grenades.

PROJECTILES

Projectiles range from 20 millimeters to 16 inches in diameter and from 2 inches to 4 feet in length. They can be filled with explosives, chemicals (to include riot-control agents such as CS), white phosphorus (WP), illumination flares, or submunitions. Projectile bodies can be one piece of metal or multiple sections fastened together.

Projectiles, like bombs, can have impact or proximity fuzing. They can also be fuzed with time-delay fuzing that functions at a preset time after firing. For safety reasons, all projectiles should be considered as having proximity fuzing. Getting too close to proximity fuzing will cause the fuze to function, and the projectile will blow up. Depending on the type of filler and the design of the projectile, the fuze can be in the nose, as shown in Figure 2-20, page 2-18, or in the base, as shown in Figure 2-21, page 2-18.

There are two ways projectiles are stabilized, by spin or fin. Spin-stabilized projectiles use rotating bands near the rear section to stabilize the projectile. See Figure 2-22, page 2-19. Riding along the internal lands and grooves of the gun tube, these bands create a stabilizing spin as the projectile is fired. Fin-stabilized projectiles may have either fixed fins or folding fins. See Figure 2-23. Folding fins unfold after the projectile leaves the gun tube to stabilize the projectile.

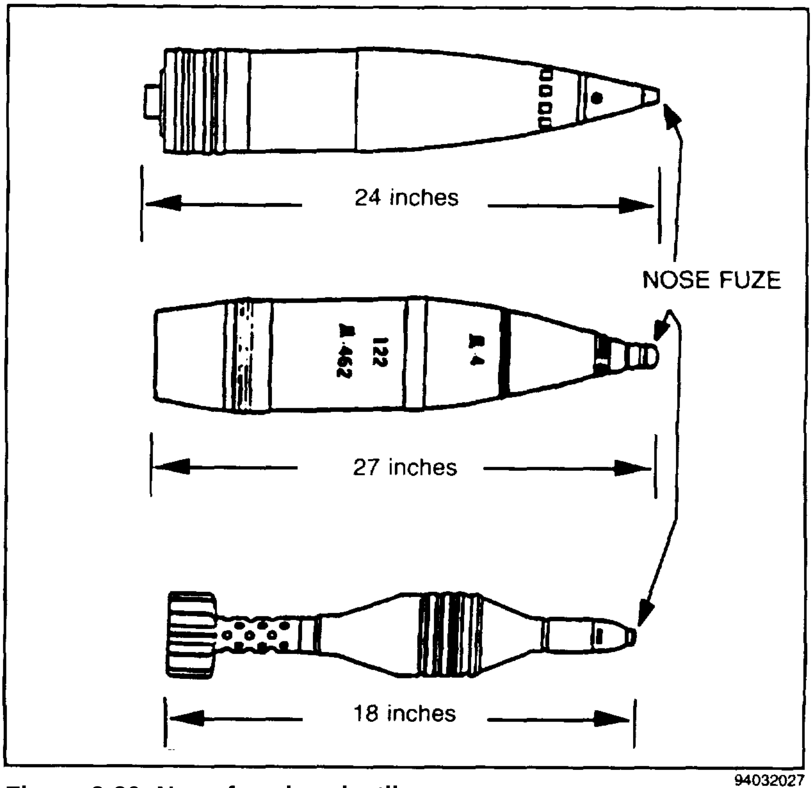

Figure 2-20. Nose-fuzed projectiles.

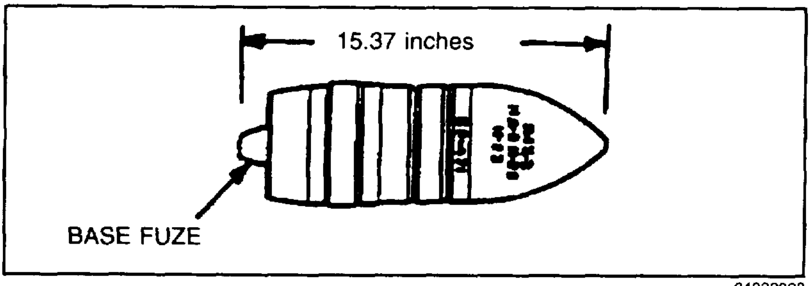

Figure 2-21. Base-fuzed projectile.

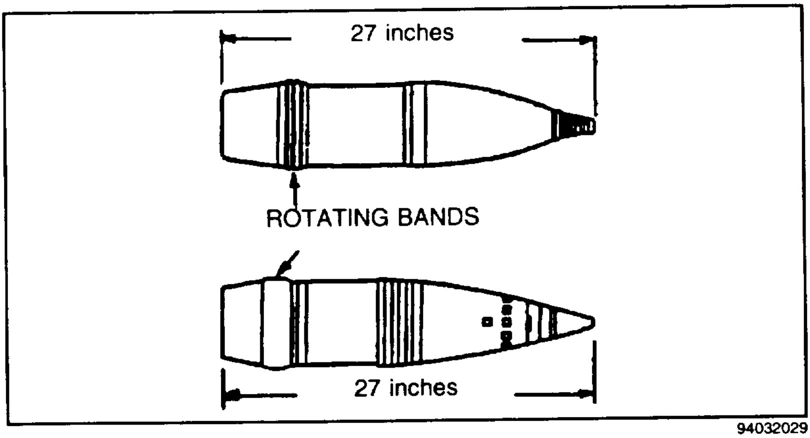

Figure 2-22. Spin-stabilized projectiles.

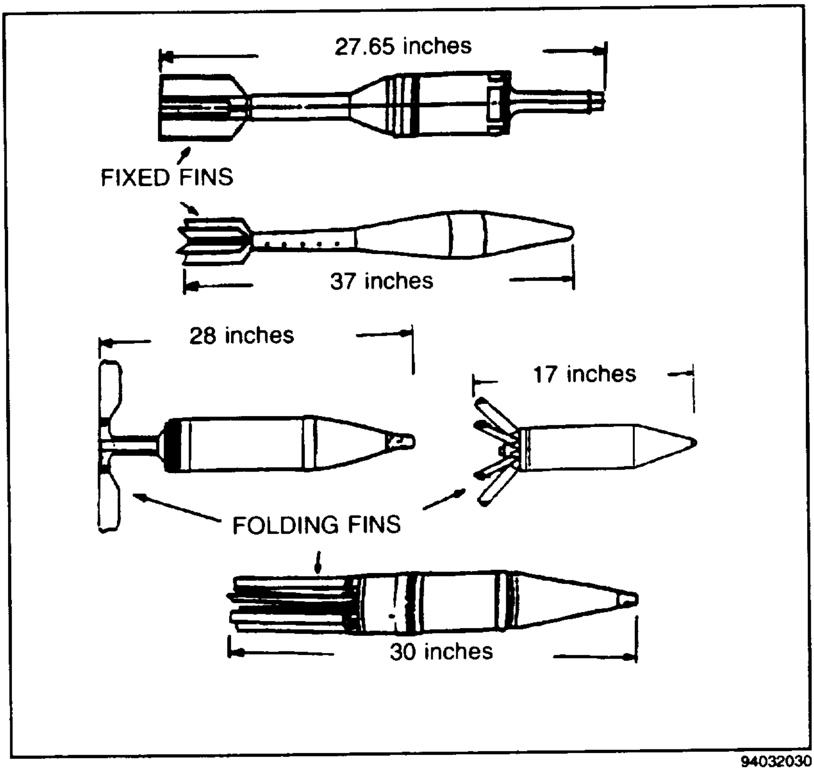

Figure 2-23. Fin-stabilized projectiles.

MORTARS

Mortars range from 45 millimeters to 280 millimeters in diameter. Like projectiles, mortar shells can be filled with explosives, toxic chemicals, WP, or illumination flares. Mortars generally have thinner metal bodies than projectiles but use the same kind of fuzing. Like projectiles, mortars are stabilized in flight by fin or spin. Most mortars are fin stabilized, like the ones shown in Figure 2-24. Other mortars are spin stabilized as shown in Figure 2-25.

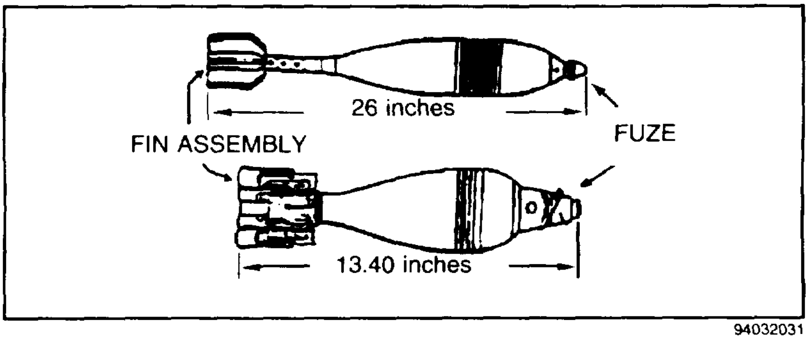

Figure 2-24. Fin-stabilized mortars.

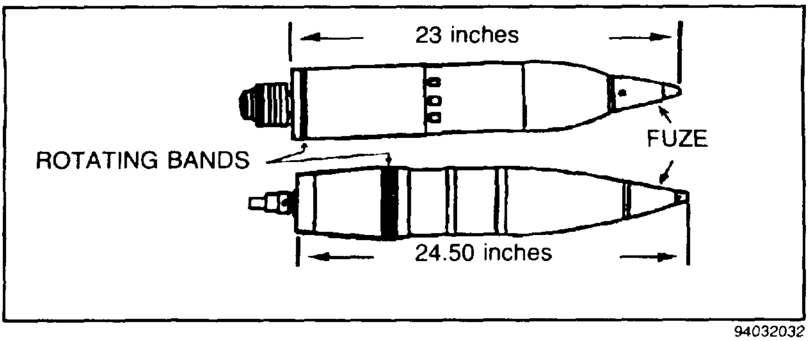

Figure 2-25. Spin-stabilized mortars.

ROCKETS

A rocket may be defined as a self-propelled projectile. Unlike guided missiles, rockets cannot be controlled in flight. Rockets range in diameter from 37 millimeters to over 380 millimeters.

They can range in length from 1 foot to over 9 feet. There is no standard shape or size to rockets, as you can see in Figure 2-26. All rockets consist of a warhead section, a motor section, and a fuze. See Figure 2-27, page 2-22. They are stabilized in flight by fins, or canted nozzles, that are attached to the motor.

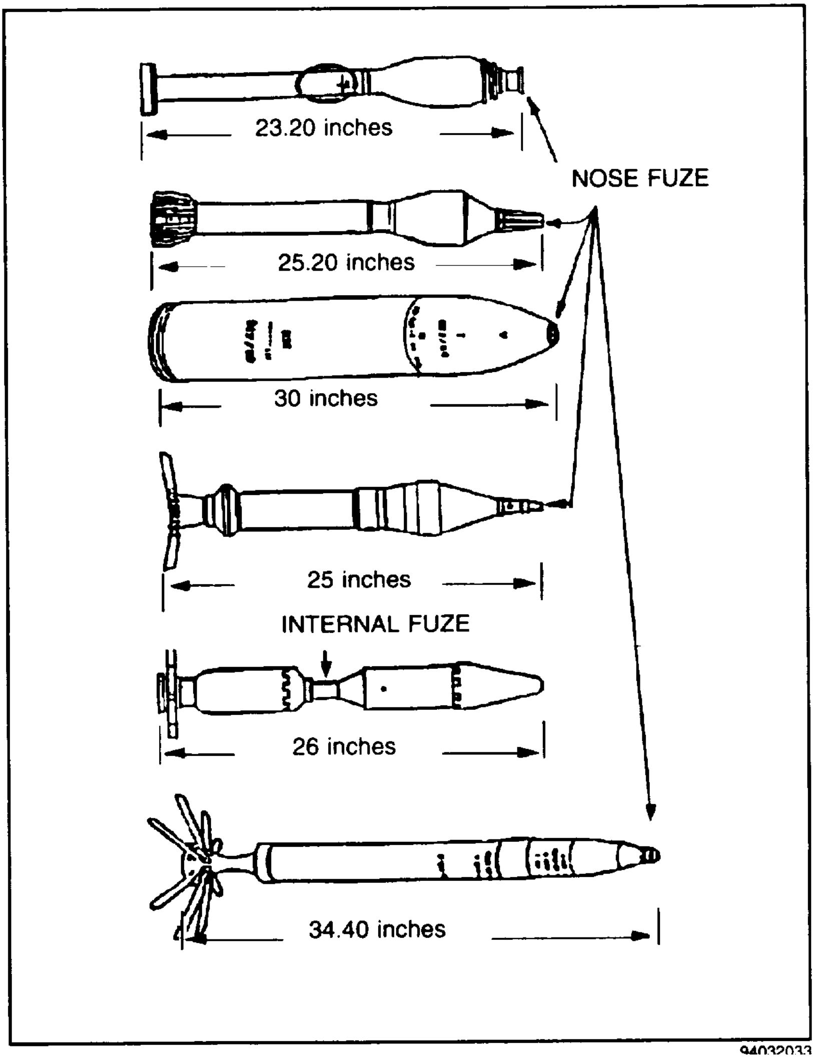

Figure 2-26. Rockets.

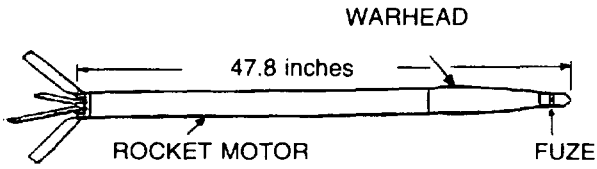

Figure 2-27. Parts of a rocket.

The warhead is the portion of the rocket that produces the desired effect. It can be filled with explosives, toxic chemicals, WP, submunitions, CS, or illumination flares. The motor propels the rocket to the target. The fuze is the component that initiates the desired effect at the desired time. Rockets use the same type of fuzing as projectiles and mortars. The fuze may be located in the nose or internally between the warhead and the motor.

Rockets can be launched or fired from individual weapons (such as the light antitank weapon system), aircraft, mobile-launch vehicles, or stationary launch pads.

Some rockets are spin stabilized. Unlike projectiles and mortars, these rockets do not have rotating bands. Instead, as shown in Figure 2-28, their motor nozzles are slanted to produce the spin. The presence of motor nozzles, or venturies, in the rear of the rocket motor can be used for positive identification purposes for this type of ordnance. Generally, the rocket motor will not create an additional hazard, because the motor is usually burned out shortly after the rocket leaves the launcher.

GUIDED MISSILES

Guided missiles are like rockets in that they consist of the same parts. The difference is that the missiles are guided to their target by various guidance systems. Some of the smaller missiles, such as the tube-launched, optically tracked, wire-guided (TOW) and Dragon missiles are wire-guided by the gunner to their targets. See Figure 2-29.

Larger missiles, such as the phased-array tracking radar intercept on target (PATRIOT) and the Sparrow are guided by radar to their

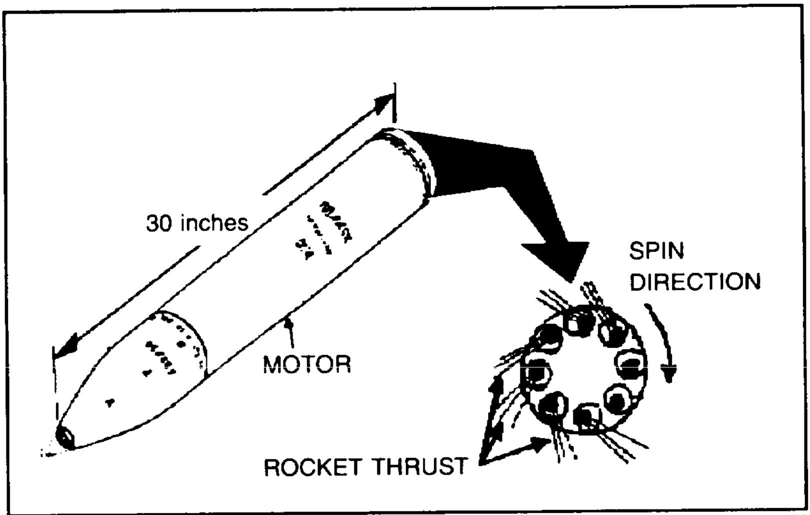

Figure 2-28. Spin-stabilized rocket.

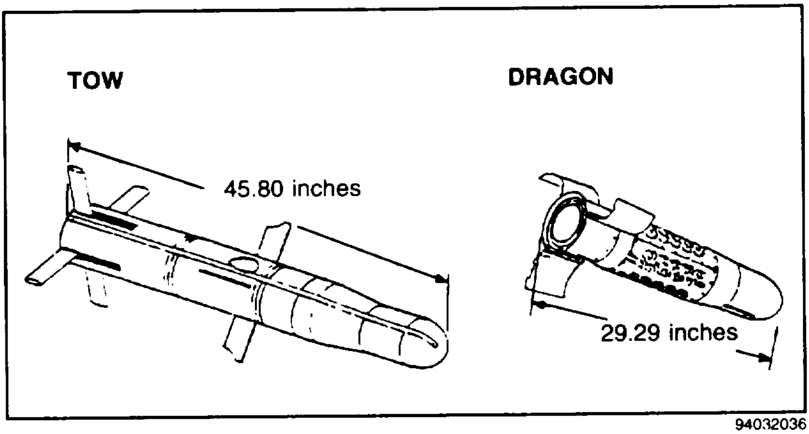

Figure 2-29. AT guided missiles.

target. See Figure 2-30, page 2-24. The radar may be internal to the missile, like the PATRIOT, or external, like the Sparrow, which uses the airplane's radar system. Guided missiles are usually stabilized in flight by fins that are controlled by internal electronics. Guided missiles use internal, proximity fuzing. Therefore, do not approach any guided missile you find lying on the battlefield.

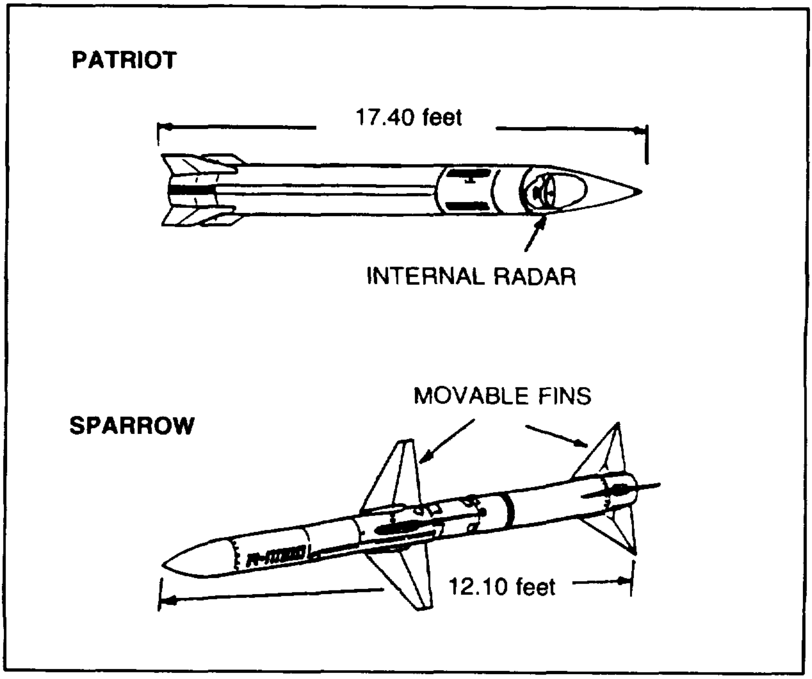

Figure 2-30. PATRIOT and Sparrow guided missiles.

RIFLE GRENADES

Rifle grenades look like mortars and are fired from a rifle that is equipped with a grenade launcher or an adapter. Many countries use rifle grenades as an infantry direct-fire weapon. Some rifle grenades are propelled by specially designed blank cartridges, while others are propelled by standard ball cartridges. Rifle grenades may be filled with high explosives (HEs), WP, CS, illumination flares, or colored screening smoke. They range in size from the small APERS rifle grenade to the larger AT rifle grenade. APERS rifle grenades use impact fuzing. See Figure 2-31. Some rifle grenades, such as the AT, have internal fuzing behind the warhead (Figure 2-32). This type of fuzing still functions on impact with the target.

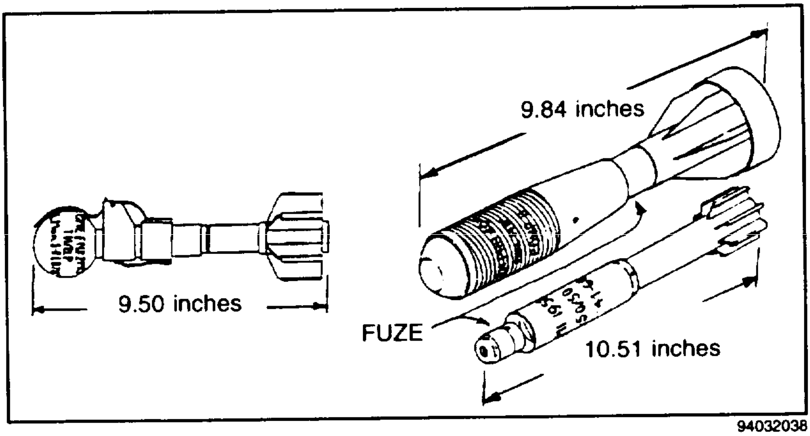

Figure 2-31. APERS rifle grenades.

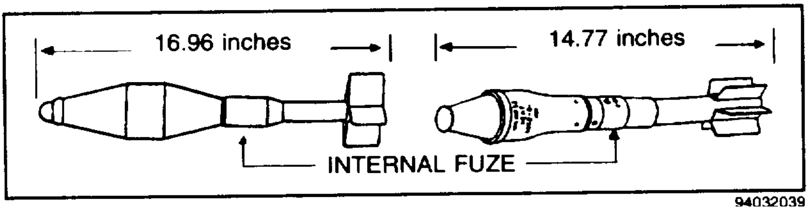

Figure 2-32. AT rifle grenades.

THROWN ORDNANCE

Thrown ordnance, commonly known as hand grenades, can be classified by use as follows:

- Fragmentation (also called defensive).
- Offensive.
- Antitank.
- Smoke.
- Illumination.

Hand grenades are small items that may be held in one hand and thrown. All grenades have three main parts: a body, a fuze with a pull ring and safety clip assembly, and a filler. See Figure 2-33, page 2-26. Never pick up a grenade you find on the battlefield, even if the spoon and safety pin are still attached. All grenades found lying on a battlefield should be considered booby-trapped.

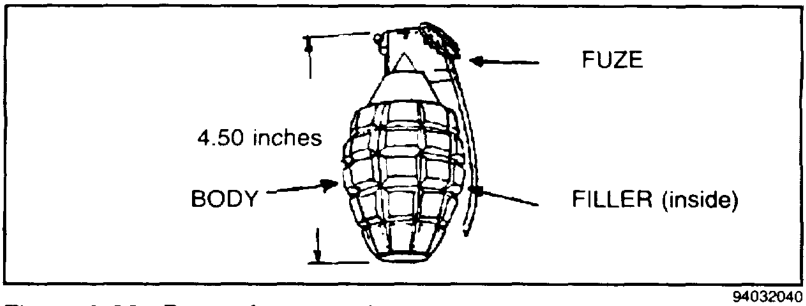

Figure 2-33. Parts of a grenade.

FRAGMENTATION GRENADES

Fragmentation grenades are the most common type of grenade and may be used as offensive or defensive weapons. See Figure 2-34. They have metal or plastic bodies that hold an explosive filler. These grenades produce casualties by high-velocity projection of fragments when they blow up. The fragmentation comes from the metal body or a metal fragmentation sleeve that can be internal or attached to the outside of the grenade. These grenades use a burning delay fuze that functions 3 to 5 seconds after the safety lever is released.

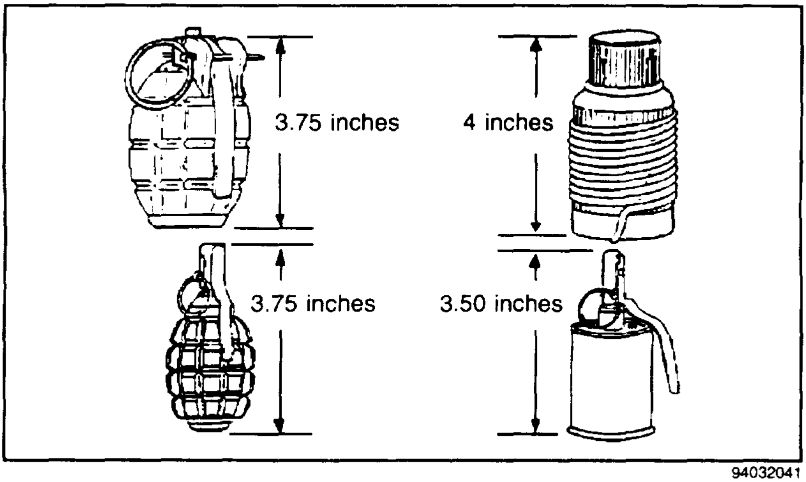

Figure 2-34. Fragmentation grenades.

OFFENSIVE GRENADES

Offensive grenades have a plastic or a cardboard body. See Figure 2-35. They are not designed to have a lot of fragmentation. Their damage is caused from the over pressure of the explosive blast. These grenades use a burning-delay fuze that functions 3 to 5 seconds after the safety lever is released.

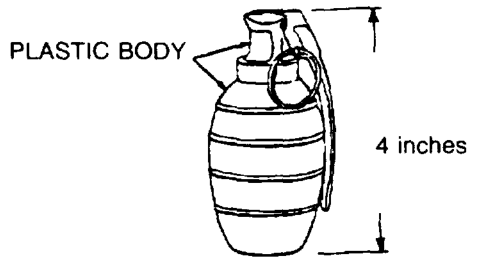

Figure 2-35. Offensive grenade.

ANTITANK GRENADES

AT grenades are designed to be thrown at tanks and other armored vehicles. They have a shaped-charge explosive warhead and are stabilized in flight by a spring-deployed parachute or a cloth streamer. See Figure 2-36, page 2-28. These grenades use impact fuzing.

SMOKE GRENADES

There are two types of smoke grenades: bursting and burning. See Figure 2-37, page 2-28. They may be made of rubber, metal, or plastic. Bursting-type smoke grenades are filled with WP and blow up when the fuze functions. These grenades use a burning delay fuze that functions 3 to 5 seconds after the safety lever is released. Burning-type smoke grenades produce colored smoke. This type of grenade uses an instant-action fuze. There is no delay once the spoon is released. This is the same type of grenade that is used to dispense not-control agents (such as CS).

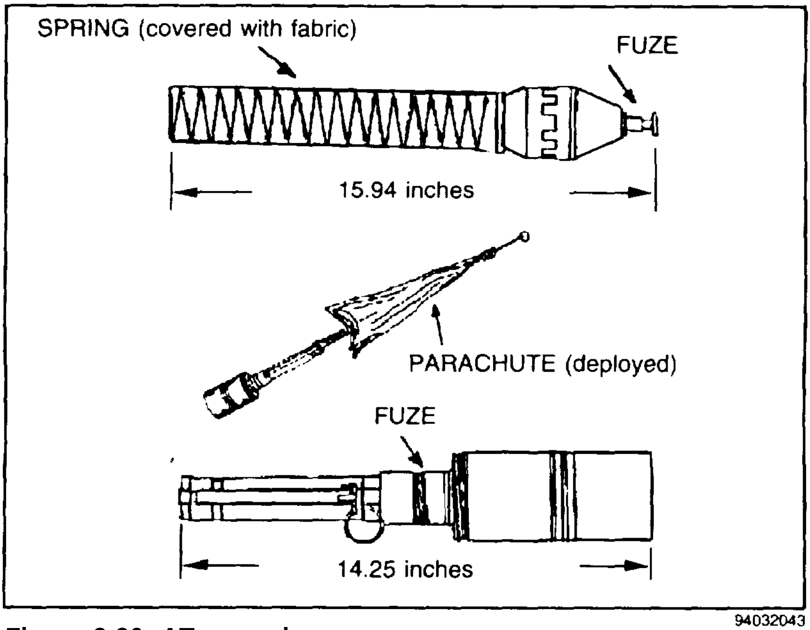

Figure 2-36. AT grenades.

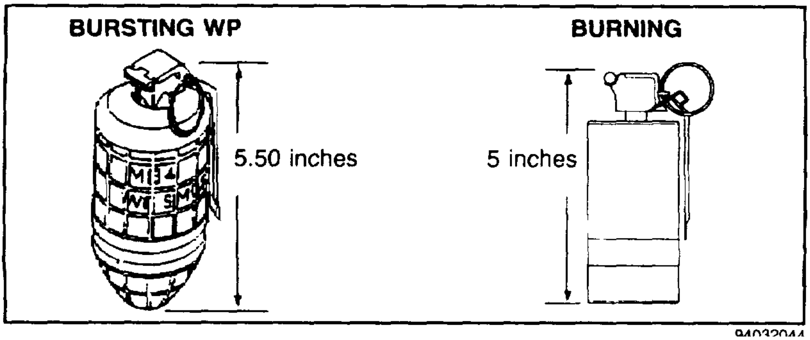

Figure 2-37. Smoke grenades.

ILLUMINATION GRENADES

Illumination grenades are used for illuminating, signaling, and as an incendiary agent. See Figure 2-38. The metal body breaks apart after the fuze functions and dispenses an illumination flare. This type of grenade uses a burning-delay fuze that functions 3 to 5 seconds after the safety lever is released.

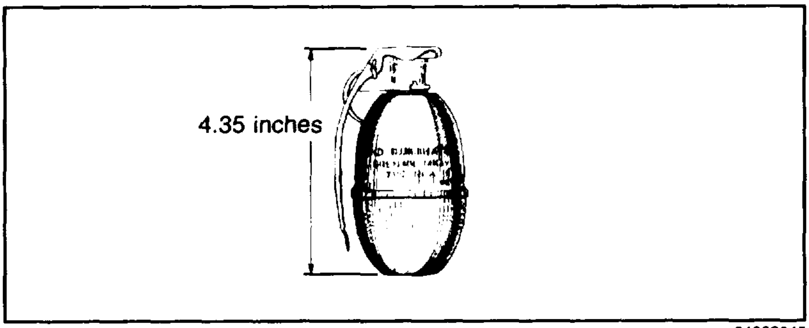

Figure 2-38. US illumination grenade.

PLACED ORDNANCE

Placed ordnance is commonly referred to as land mines. Land mines may be hidden or buried under the ground and may be classified as APERS or AT. Visual detection of land mines may be difficult at best. If you come to a suspected minefield, report it as a minefield to your commander. All combat arms personnel report a minefield on an obstacle report. For further information and procedures for reporting land mines, refer to FM 20-32. Photographs of placed ordnance and NEWS are in Appendix E.

ANTIPERSONNEL MINES

APERS mines are generally small and come in different shapes and sizes. See Figure 2-39, page 2-30. Some APERS mines are even made of wood, for example, the box mine shown in Figure 2-39. Some APERS mines are designed to function when stepped on, such as those shown in Figure 2-39. Other APERS mines are designed for use as booby traps. See Figure 2-40, page 2-30. These mines are set up to function by using a trip wire laid out across a path or road. When the trip wire is pulled or cut, the fuze functions. Some APERS mines, such as the US claymore mine, may be set up to function by command detonation.

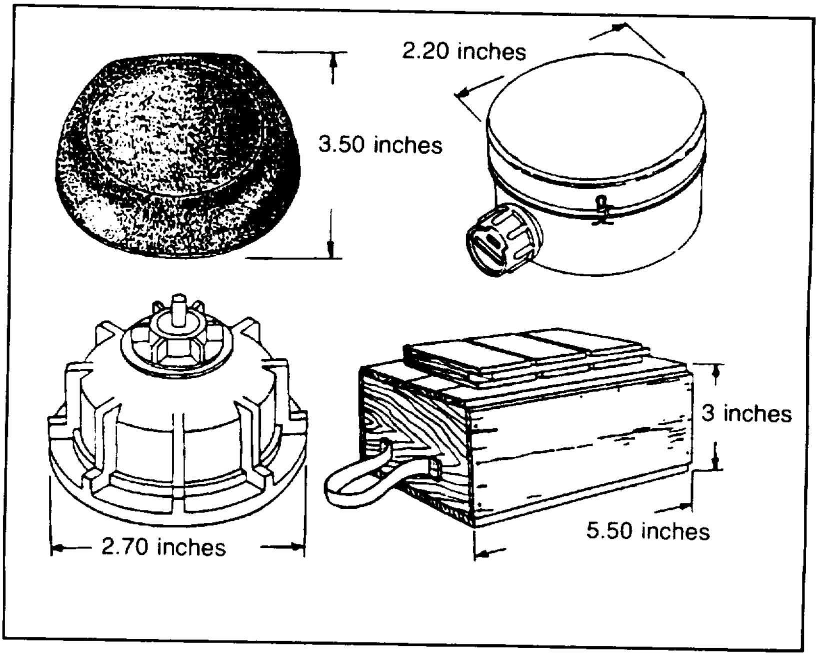

Figure 2-39. APERS pressure-fuzed mines.

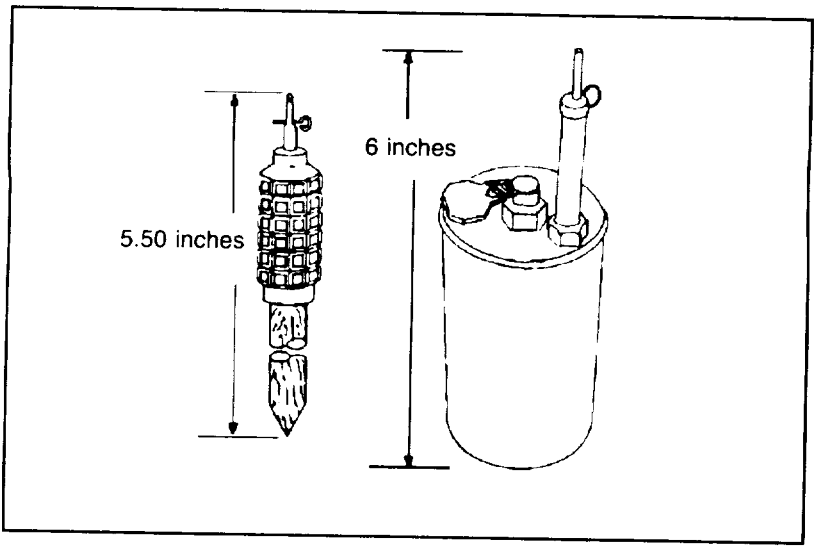

Figure 2-40. APERS trip wire-fuzed mines.

ANTITANK MINES

AT mines are much larger than APERS mines and usually have pressure or tilt-rod fuzing. However, some AT mines also use magnetic-sensitive fuzing. Some of the more modem AT mines have plastic bodies, which make them hard to detect with a metallic mine detector. The variety of AT mines shown in Figure 2-41 all function by direct pressure from a tank or vehicle. The mines shown in Figure 2-42, page 2-32, use a tilt-rod fuze that sticks out of the ground. When the rod is moved or pushed over, the mine blows up.

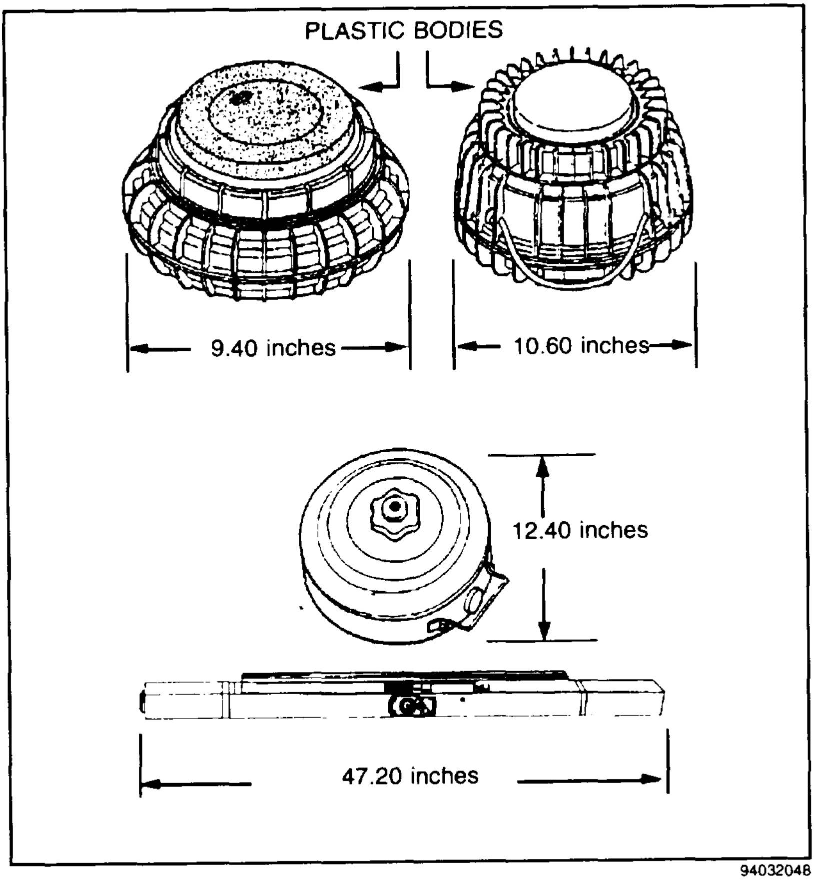

Figure 2-41. AT pressure-fuzed mines.

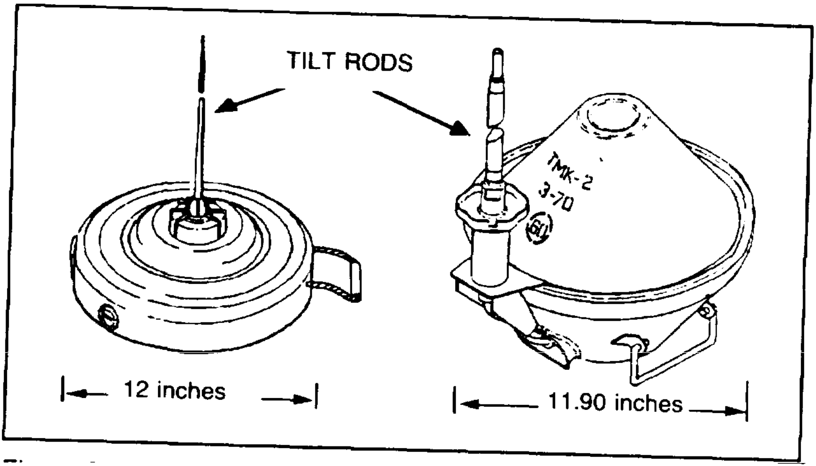

Figure 2-42. AT tilt-rod fuzed mines.